Aware

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Climate, Water, Weather

Amateur Radio Operators: A Valuable Resource For Emergency Communications

By Dennis H. McCarthy, Director, Office of Climate, Weather and Water Services

Now that we are well into summer, many eyes are focused on the breeding areas for tropical storms. We certainly hope we don't see a repeat of last year's disastrous hurricane season, but many preparations have been made for whatever this season might bring.

While surfing the National Hurricane Center's website recently (www.nhc.noaa.gov), I clicked on the WX4NHC radio link. This group of volunteer amateur radio operators staff the station at NHC whenever a hurricane is within 300 miles of landfall in the western Atlantic, Caribbean or eastern Pacific. The WX4NHC station makes use of a larger network of amateur radio stations to collect real time ground truth reports for NHC. The net operates on a frequency of 14.325 MHz in the amateur radio 20-meter HF band.

My tour through the WX4NHC site reminded me of how valuable local amateur radio operators were at NWS Weather Forecast Offices (WFOs) during last year's extremely active hurricane season, especially during Hurricane Katrina. These volunteers assist WFOs throughout the year during all kinds of hazardous weather events. During recent heavy rain, flooding and severe storms here in the Washington, D.C., area, I listened to the net supporting the forecast office in Sterling, VA, on the 147.300 MHz repeater near Bluemont, VA.

Emergency communications are the focus of the annual Field Day exercise organized by the American Radio Relay League (ARRL). To demonstrate emergency communications and have a little fun at the same time, amateur radio operators across the U.S. and parts of Canada set up portable stations in a 24-hour period, usually the fourth weekend of June. As I took part in this year's Field Day, I noticed there seemed to be more "F" category stations on the air. These F categories are stations operating from locations such as emergency operations centers. Maybe last year's events helped more emergency officials realize the value of partnering with their local amateur radio operators.

If emergency communications are important to you during hazardous weather or flood events and you have not yet linked up with amateur radio operators in your area, consider doing so. You can usually find them on the Internet. Start with the American Radio Relay League (www.arrl.org). If you don't have a license yet, look into obtaining one. It's easier these days; even I did it. My call sign is KC5EVH. I hope to talk to you on the air one of these days. Maybe we will chat during the next national SKYWARN Appreciation Day, usually the first Saturday in December.

Inside Aware

Aviation News

Free Aviation Safety Tips Available in *The Front*

By Melody.Magnus, Editor, The Front
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In June, The NWS Aviation Branch released its summer edition of *The Front*, a free source of aviation weather tips. Articles in this edition include:

- *Model Output Statistics Provide Essential Data for Small Airports*
- *Microburst Recognition Makes Navigating West and Southwest Safer and More Accurate*

To be notified when *The Front* is released, email nws.postmaster@noaa.gov. To download the June edition, go to weather.gov/os/aviation/front.shtml. If you have article suggestions or comments, contact Michael.Graf@noaa.gov ❄

Digital Services

Aware

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Digital Services Product Improvements for 2006

By Glenn Austin, Digital Services Transition Manager
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NWS continues to evolve services in this digital era. Increasing amounts of weather data are being generated, converted to digital format, and then downloaded over the Internet for use by millions of businesses, schools and households. Below is a summary of improvements in digital products and services planned for this summer and fall.

GIS Tutorials

NOAA's Coastal Services Center recently assisted NWS by creating two support documents for the growing number of Geographic Information System (GIS) users. The tutorials listed below help users access, decode and display the data stored in the National Digital Forecast Database (NDFD) according to their individual user preferences.

- NDFD DeGRIB and GRIB2 Data Download and Image Generation Tool Tutorial: www.weather.gov/ndfd/gis/ndfd_tutorial.pdf.
- Using NDFD gridded data in a GIS Environment (Shapefiles and Floating Point Grids): www.weather.gov/ndfd/gis/ndfd_GIS_tutorial.html.

The second tutorial contains timely information on using digital data for pre-hurricane landfall decision making. It also includes examples from Hurricane Ivan (See Figure 1). For more information on accessing NDFD, go to www.weather.gov/ndfd/technical.htm.

NDFD Continues to Grow

On July 5, NWS added new experimental Tropical Cyclone Surface Wind Speed Probability forecasts. These new products are available for the Continental United States (CONUS) and adjacent coastal waters. The Tropical Prediction Center (TPC) produces these gridded forecasts for tropical cyclone surface wind speed probabilities through 120 hours, in 6 hourly intervals, with a 5 kilometer spatial resolution. TPC provides the forecasts for three wind speed thresholds: 34, 50 and 64 knots and two types of wind speed probabilities, cumulative and incremental, for a total of six new grids.

In early September, NWS plans to add experimental Wind Gust forecasts to NDFD for CONUS, Puerto Rico, the Virgin Islands, Hawaii and Guam. The Wind Gust element extends through 72 hours; it will be experimental for 6 months, during which time NWS will request user feedback and comments. Afterward NWS staff will evaluate comments and conduct an internal technical assessment to determine the future of the NDFD Wind Gust forecasts.

NWS Staff also are making finishing touches to the Alaska digital frontier. NWS staff has set September 6 as their tentative date to add the first experimental elements for Alaska: maximum and minimum temperature, probability of precipitation, wind direction and speed and significant wave height.

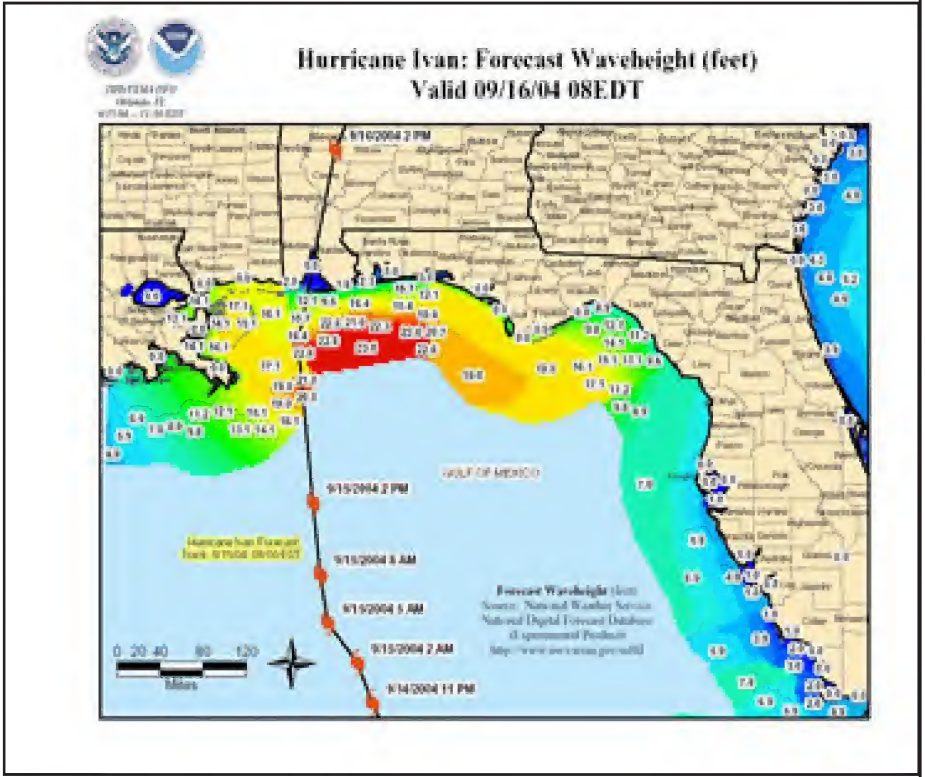

Figure 1: *Example of forecast wave height along the shore of the Gulf of Mexico during Hurricane Ivan from GIS tutorial developed by NOAA's Coastal Services Center.*

Smaller Bits and Bytes

Currently, each forecast element file in NDFD contains multiple forecast grids for up to 7 days. All of these grids are created and posted hourly. This can produce files that are too large for reliable data transfers and forces customers to download up to 7 days of data (up to 12 megabyte files) even if they are only interested in a single day or hour.

To resolve these issues, starting on September 6, operational and experimental NDFD element files for all domains will be split into smaller files covering either days 1 through 3 or days 4 through 7. Also, days 4 through 7 forecasts will only be updated 4 times per day (at 0000, 0600, 1200, and 1800 Coordinated Universal Time). Splitting each NDFD element file into smaller pieces benefits both the NWS and users. Smaller file sizes will make ftp access to NDFD element files more efficient and reliable. Days 4 through 7 elements will be updated only four times per day, reducing the number of times users will need to download these files. Processing and posting smaller element files should also improve reliability and throughput for users.

This change primarily affects users who "pull" the NDFD elements from the NWS's anonymous ftp server in Gridded Binary 2 (GRIB2) format. This includes ftp users pulling NDFD elements via the Internet and via the Family of Services Server Access Service. Users of NDFD graphics and NDFD in eXtensible Markup Language (XML) via web service do not need to change how they view or acquire NDFD elements after the September 6 split. The only change that affects graphics and XML users is reducing updates for Days 4 through 7 to four times per day.

XML Service a Hit

NWS continues to upgrade its services from a text-based system to a digital one. The goal is to make NWS information available efficiently in standardized electronic formats. The NDFD is one example of this transformation. NDFD XML takes yet another step forward by making NDFD data available for computer-to-computer transfer and processing. Since May 2004, NDFD has been available, on an experimental basis, in XML via web service which allows users to integrate NDFD data into computer applications and create value added products.

NWS plans to make this service operational before the end of this year. Look for a Technical Information Notice announcing this soon at www.weather.gov/os/notif.htm.

For more information on using XML is and how to use with NWS products, go to www.nws.noaa.gov/xml/ ❄

November NDFD Technical Workshop Planned

By Glenn Austin, Digital Services Transition Manager
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To follow up on its initial successful NDFD Technical Workshop in August 2003, NWS is planning a second conference this November. The initial 1-day event was attended by about 65 partners and customers, representing public, private and academic sectors. The expansion of NWS digital information and capabilities will create many more opportunities for NWS product users. The upcoming seminar will focus on the complex details including dataflow, data formats and availability, decoders, web services, tools and other services. Tentatively, the meeting is scheduled to be held in Silver Spring, MD. Keep an eye out for additional details and announcements regarding this meeting. For updates on this workshop, email: glenn.austin@noaa.gov.❄

NOAA To Implement New Weather Analysis System for Digital Services

By Lee Anderson, AOR Project Coordinator, NWS OST
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This summer, a team of NOAA meteorologists will complete the first phase of the Analysis of Record (AOR) project. AOR is a system that will be used to analyze gridded weather data. The first phase of the project, the Real-Time Mesoscale Analysis (RTMA), will provide NWS forecasters with high-resolution analysis of weather information for CONUS. This data will help NWS staff prepare gridded forecasts.

RTMA will produce an hourly analysis and estimate of analysis uncertainty for surface temperature, humidity and wind. In addition, RTMA will generate hourly analysis of sky cover and precipitation. The RTMA products match NDFD specifications, allowing forecasters to use RTMA grids directly for digital forecast preparation. The NDFD is NWS's main source for gridded weather forecasts of weather parameters such as temperature and wind: www.weather.gov/forecasts/graphical/sectors/.

RTMA was developed by the National Centers for Environmental Prediction's (NCEP) Environmental Modeling Center (EMC). Development support was provided by NOAA's Earth Systems Research Laboratory/Global Systems Division and National Environmental Data and Information Service (NEDSDIS)

Data for the RTMA comes from land and ocean based weather observations, precipitation measurements from 3,000 rain gauges, and from radar and satellite information.

Geoff DiMego, NCEP EMC, and a co-leader of the NWS AOR team, said "The RTMA products are expected to be transmitted to users through NOAAPort in August 2006." He added, "Additional RTMA product development and system development for other regions, such as Hawaii, will start in late 2006. The standard product suite for the non-continental U.S. regions, will be available in 2008."

RTMA will provide more near real-time, high-resolution weather information to NWS meteorologists. Forecasters will be able use the RTMA products for an initial verification of gridded forecasts produced for the NDFD.

Users will benefit from improved digital forecasts. In addition, output from the RTMA could be used for other computer model applications to help provide better weather products and services for the public.

The RTMA gridded information will be available in GRIB 2 format in the NWS National Digital Guidance Database (NDGD) for users to access for their own applications. GRIB 2 is one type of data format: www.weather.gov/forecasts/graphical/docs/grib_design.html. NDFD products are provided in GRIB 2 format among other types. Products from the RTMA analysis will be archived at NOAA's National Climatic Data Center (NCDC) in Ashville, N.C.

The RTMA is the proof-of-concept, first phase, of the AOR project. The second phase will be developing and implementing the main AOR system, which will be an enhanced analysis of weather information using a more comprehensive set of weather observations. This system will be used for the official verification of NDFD forecasts archived at NCDC. The AOR system may also be applied to other computer modeling applications including hazardous materials and fire weather.

The third and final project phase will be using the system to analyze 25 to 30 years of data to study the climatology of smaller geographical domains, like urban areas.

RTMA graphical displays of the experimental hourly analyses of temperature, dew point and wind are online at www.emc.ncep.noaa.gov/mmb/rtma/.

RTMA GRIB2 files will be available in August in NDGD at:
ftp://tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndgd/GT.rtma/AR.conus.❄

Dissemination/Weather Radio

HazCollect Operational Acceptance Test Nears Conclusion

By Herb White, NWS Dissemination Services Manager
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HazCollect took a large step forward in June when the server and software development project began Operational Acceptance Testing (OAT). During the testing, emergency managers in four areas of the country (southwest Pennsylvania, western Kentucky and southern Illinois, central California and the Kenai Peninsula in Alaska) worked with local NWS offices to review HazCollect. Staff and emergency managers sent test, as well as actual emergency messages, using the Disaster Management Interoperability Services (DMIS) Desktop Toolkit.

The OAT uncovered a few discrepancies NWS will fix before deployment. NWS expects HazCollect to be made available nationally this fall when the U.S. Department of Homeland Security (DHS) distributes an update of the DMIS Desktop Toolkit.

NWS has a commitment from the HazCollect primary contractor, Battelle, that an issue regarding compliance with Common Alerting Protocol (CAP) format standard will be resolved before HazCollect is operational. NWS recognizes the importance of CAP formatting standards

to the success of HazCollect and interoperability of the nation's public warning infrastructure. NOAA is committed to shifting to the CAP standard, while remaining compliant with existing message formats and existing older systems.

NWS also is working with DHS to write HazCollect Applications Program Interface (API) specifications. API will allow web services to interface with DHS's Open Platform for Emergency Networks (OPEN), previously known as the Disaster Management Interoperability Backbone. These interfaces enable information sharing between diverse commercial and government systems. There is no charge for the use of these Federal government interfaces.

To use HazCollect for broadcasting messages over NOAA Weather Radio All Hazards, the Emergency Alert System, other NWS dissemination systems and national systems such as DMIS, users must first establish a Collaborative Operations Group (COG) identity for user authentication. To obtain a COG ID number and name, register at the DMIS web site below. Registrants who do not have other government or commercially provided incident or emergency management software can obtain DMIS software via the registration process.

This fall when NWS opens HazCollect registration, users can register by going to dmi-services.org/. To register for DMIS, click on "Register" in the left menu. For updates on HazCollect, go to www.weather.gov/os/hazcollect/. ❄

Public Television Stations, FEMA Put Digital Emergency Alert System to the Test

By Mark Paese, Director, NWS Operations Division and Homeland Security Activities
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On July 12, the Association of Public Television Stations (APTS) and Department of Homeland Security's FEMA tested Phase Two of the Digital Emergency Alert System (DEAS). The project demonstrated how DHS can improve and broadcast public alerts and warnings during a national crisis by using local public television's digital television broadcasts.

The event, which took place at a metro Washington D.C. public television station, WETA, in Arlington VA, was combined with simultaneous events at several other public television stations across the country taking part in the pilot. APTS set the capabilities of digital broadcasting through a two-year project in the National Capital Region.

The initial phases of this project included the Public Broadcasting Service (PBS), WETA, and 25 other public television stations across the country. APTS and FEMA were also joined by partners in the commercial television, cable, cellular, paging and radio industries.

SpectraRep, a professional services firm, provides technology and management consulting services to the television stations. As a method to improve distribution of public alerts and warnings of national significance, the DEAS will not impact existing NOAA/NWS systems. For more information, go to:

http://www.fema.gov/pdf/media/2006/deas_fact_sheet.pdf
http://www.fema.gov/pdf/media/2006/deas_pilot_project.pdf. ❄

President Bush Signs Executive Order On Public Alert and Warning System

By Mark Paese, Director, NWS Operations Division and Homeland Security Activities
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On June 26, President Bush signed an Executive Order entitled "Public Alert and Warning System." The Executive Order states: "it is the policy of the Untied States to have an effective, reliable, integrated, flexible and comprehensive system to alert and warn the American people in situations of war, terrorist attack, natural disaster, or other hazards to public safety and well-being (public alert and warning system), taking appropriate account of the functions, capabilities and needs of the private sector and of all levels of government in our Federal system, and to ensure that under all conditions the President can communicate with the American people."

The Executive Order further states: "the Secretary of Commerce shall make available to the Secretary of Homeland Security, to assist in implementing this order, the capabilities and expertise of the Department of Commerce relating to standards, technology, telecommunications, dissemination systems and weather. . ."

In collaboration with the DHS, through various Integrated Public Alert and Warning System (IPAWS) pilot programs, the Department of Commerce will integrate various systems such as NOAA Weather Radio All Hazards, digital television and radio, satellites, cell phones and the Internet to develop interoperability between systems.

The Executive Order also requires the U.S. government to "establish or adopt, as appropriate, common alerting and warning protocols, standards, terminology and operating procedures for the public alert and warning system to enable interoperability and the secure delivery of coordinated messages to the American people through as many communication pathways as practicable, taking account of Federal Communications Commission rules as provided by law . . ." and ". . . include in the public alert and warning system the capability to alert and warn all Americans, including those with disabilities and those without an understanding of the English language."

While there may be no immediate affect on NWS systems through the inclusion of its dissemination systems, The Department of Commerce can assist the Secretary of Homeland Security in the implementation of this order. ❄

EMWIN-N Satellite Tests to Begin

By Rob Wagner, NWS office of the Chief Information Officer
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Great news for the EMWIN-N transition. On May 24, GOES-N was launched successfully and arrived at its destination point near 90 degrees west. The launching clears the way for the final tests of the EMWIN-N prototype.

An EMWIN-N plan has been developed to test the broadcast through the GOES-N satellite. The results are expected to reflect the earlier successful bench tests in November 2005 at the NESDIS Command and Data Acquisition Station. The EMWIN-N tests are tentatively scheduled for July 31 through August 4. Once completed, the results will be posted on the EMWIN website and should prove helpful for potential manufacturers of EMWIN-N equipment.

GOES Satellite

With the expectation of a successful GOES-N field test of the EMWIN-N prototype, the team has begun planning for another user-vendor conference. The timing and details will be announced on the EMWIN website once they become firm.

To keep EMWIN developments, go to: iwin.nws.noaa.gov/emwin/index.htm ❄

New Local Numerical Weather Prediction System Released

By Robert Rozumalski, National SOO Science and Training Resource Coordinator
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The NWS Science and Operations Officer (SOO), Science and Training Resource Center (SOO/STRC) and the Forecast Decision Training Branch released a new numerical weather prediction (NWP) package in May. The Weather Research and Forecasting Environmental Modeling System (WRF EMS) was developed for use by NWS Forecast Offices, the university community and the private sector as a complete, full-physics, end-to-end numerical weather prediction (NWP) system. The package incorporates versions of the National Center for Atmospheric Research (NCAR) and the National Center for Environmental Prediction (NCEP) Weather Research and Forecasting (WRF) models.The objectives of the product are threefold:

- Improve the use and understanding of NWP models
- Advance forecasting through better understanding of atmospheric processes
- Increase collaboration among the WFOs and other agencies.

Running the WRF EMS locally is a powerful tool for conducting training and science in the office, from studying local forecast problems and historically significant weather events to developing and testing new diagnostic forecasting techniques. The WRF EMS was also developed to encourage collaboration between WFOs and the university community.

The traditionally difficult task of installing and running a NWP model is greatly simplified with the WRF EMS. Even staff with little or no modeling expertise should have little problem installing and running the system.

We have tried to consider the entire process in developing this product: Acquiring data, running the model and processing the forecasts to view in a variety of display systems including AWIPS. The system even supports running the model on multiple computers at once to decrease forecast generation time.

Our office provides support to NWS and other governmental agencies and partners for the WRF EMS, including suggestions on computer hardware, tips for setting up and running the system and providing data to run the model.

WRF EMS has been sent to all WFOs, in addition to users at seven universities, NASA and the U.S. Air Force, five private sector companies and users in 11 foreign countries. For more information on the WRF EMS, contact Robert.Rozumalski@noaa.gov ❄

Update on VTEC in Flood Products for Forecast Points

By Tom Donaldson, Hydrologic Services Branch
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This past spring, as part of a Risk Reduction Activity for the RiverPro software application, selected NWS offices began issuing operational Flood Warnings, Watches and Advisories for Forecast Points with Experimental VTEC (using the X code). The products involved include:

- Flood Warning for Forecast Points (FLW)
- Flood Statement: Follow-up for Flood Warning for Forecast Points (FLS)
- Flood Advisory for Forecast Points (FLS)
- Flood Watch for Forecast Points (FFA)

WFOs prepare these products using the RiverPro software application on AWIPS. A formal Operational Test and Evaluation (OT&E) for these products began on June 27 and will continue through August 4. Pending a successful OT&E, the products will go operational nationwide October 18, 2006.

For more information on the Risk Reduction and OT&E schedules, including the offices taking part, go to www.nws.noaa.gov/os/vtec/hydro_vtec.shtml.

For more information on VTEC, including the phenomenon and significance codes associated with these hydrologic products, go to www.nws.noaa.gov/os/vtec/.

Later in the year, NWS plans to test other products containing Hydrologic VTEC, such as Flash Flood Warnings. ❄

Disaster Coordination

NWS Takes Part in Full-Scale Emergency Response Exercise

By Vern Preston, WCM, NWS Pocatello, ID
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Donna Mills, Administrative Assistant at NWS Pocatello, ID, recently took part in *Operation Aware and Prepared Strategic National Stockpile Full-Scale Exercise* in Power County, ID. The operation's purpose was to develop emergency response plans providing a well-coordinated, integrated response to a wide range of disaster scenarios.

To test components of this response system, the Southeastern District Health Department held a full-scale emergency response exercise simulating an event in which communities were given medication as a preventative measure.

In such an event, medications are to be deployed to Points of Distribution (POD) sites. Donna volunteered to fill the position of clerical manager for the POD site in American Falls, ID. Her duties at the WFO uniquely qualified her to take part in the exercise.

During the exercise, Donna oversaw collection of patient forms, data entry, and

NWS Pocatello, ID, Administrative Assistant Donna Mills prepares official forms for participants in disaster exercise.

completion of daily use forms. Donna set up administrative functions, secured the collection of patient forms and ensured all forms were delivered daily to the Health Department.

During the event, volunteer "patients" took part in the exercise by going through the POD to get "medications." ❄

Incident Meteorologists Expand to All Hazards Training

By Heath Hockenberry, National Interagency Coordination Center
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For more than 90 years, NWS has been a critical first responder to wildfires affecting the nation's lands and economy. Today, NWS has a cadre of 60 meteorologists specially trained to provide onsite weather briefings and forecasts. The meteorologists' forecasts allow responders to plan operations, taking into account one of the most changeable aspects of a wildfire incident—weather. These on-site forecasters, known as Incident Meteorologists (IMET), bring their individual specialized training and the support of each NWS Forecast Office to the incident.

The evolving nature of NWS's response to incidents of national significance, however, is adding an extra dimension to the IMET program. For the past 5 years, IMETs have been increasingly called upon to assist with incidents not involving fire weather. This specially trained group is adapting to respond to hurricanes, oil spills, hazardous material releases and other incidents requiring the knowledge of an on-site meteorological expert. As a result, NWS provided the IMETs with their first ever All Hazards training workshop this year. The workshop instructors, from Idaho State University, covered subjects from hazardous materials to weapons of mass destruction.

National Fire Weather Operations Coordinator Larry Van Bussum assists IMET Lisa Reed with all-hazards training questions at the first All Hazards training for NWS Incident Meteorologists.

This workshop helped bring the IMET program into compliance with the National Response Plan by providing training and FEMA certification on the Incident Command System and the National Incident Management System. This special training will enhance the IMETs' ability to assist state and federal emergency responders in keeping on-site personnel safe and in planning more effective response. ❄

Nevada Partnership Promotes Flood Safety With "Turn Around Don't Drown"

By Andy Bailey, WCM. NWS Las Vegas, NV
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The Allstate Foundation is awarding $16,000 to the Federal Alliance of Safe Homes (FLASH) to partner with the NWS on an award-winning public safety campaign, "Turn Around Don't Drown." The campaign goal is to warn residents and visitors in Nevada of the dangers of crossing floodwaters.

"The program uses a simple catch phrase to remind people that whether driving or walking, if you approach a flooded pathway and are in doubt, "Turn Around Don't Drown," said Eric Cote, spokesperson for FLASH, Inc.

Floods are typically the most widespread of weather-related natural disasters. Flash floods are the most dangerous kind of floods because they combine the destructive power of a flood with incredible speed and unpredictability. Since Las Vegas receives an average of just under 4.5 inches of rain in a typical year, many people underestimate just how significant a problem floods can be in Nevada.

Strong monsoon-driven thunderstorms, combined with the soil's inability to absorb the rainfall, produces dangerous floods in this area. As little as a half inch of rain in 30 minutes can begin to cause problems and only 6 inches of fast-moving water can knock you off your feet. Two feet of water can sweep an SUV off the road. Most people simply underestimate the force and power of water.

In the last 5 years, the desert Southwest has experienced 525 flash floods. Last year alone, NWS offices in the region issued well over 300 flash flood warnings. Since 2000, flash floods have killed 29 people in the desert Southwest and caused an estimated $129 million in damages. Emergency response squads have rescued several hundred people from floodwaters during swift water rescues.

"The Allstate Foundation hopes that this campaign will educate people to act responsibly when they come upon flood waters, and not try to drive through them," said Machele Culp, Allstate Foundation spokesperson. "When people are armed with the facts, they will be better prepared to make safe decisions in dangerous situations."

Elements of the Turn Around Don't Drown campaign include:

- 30-second television public service announcements and 15-second radio spots to run in English and Spanish
- Pre-show movie theater ads to run for 3 weeks in two major Nevada theaters
- "Flash" cards in English and Spanish with flood safety information NWS will distribute

The campaign advises people to follow these rules:

- If flooding occurs, get to higher ground. Stay away from flood-prone areas such as low spots, ditches and washes.
- Avoid flooded areas or those with rapid water flow. Do not attempt to cross a flowing stream. It takes only 6 inches of fast flowing water to sweep you off your feet.
- Do not allow children to play near high water, storm drains or ditches. Hidden dangers could lie beneath the water.
- NEVER drive through floodwaters or on flooded roads. Flooded roads could have significant damage hidden by floodwaters.
- Do not camp or park your vehicle along streams and washes, particularly when threatening conditions exist.
- Be especially cautious at night when it is harder to recognize flood dangers.
- Monitor NOAA Weather Radio All Hazards or local media for key weather information. ❄

Saving Lives by Improving Spring Flooding Awareness in Alaska

By Audrey Rubel, NWS Alaska Region
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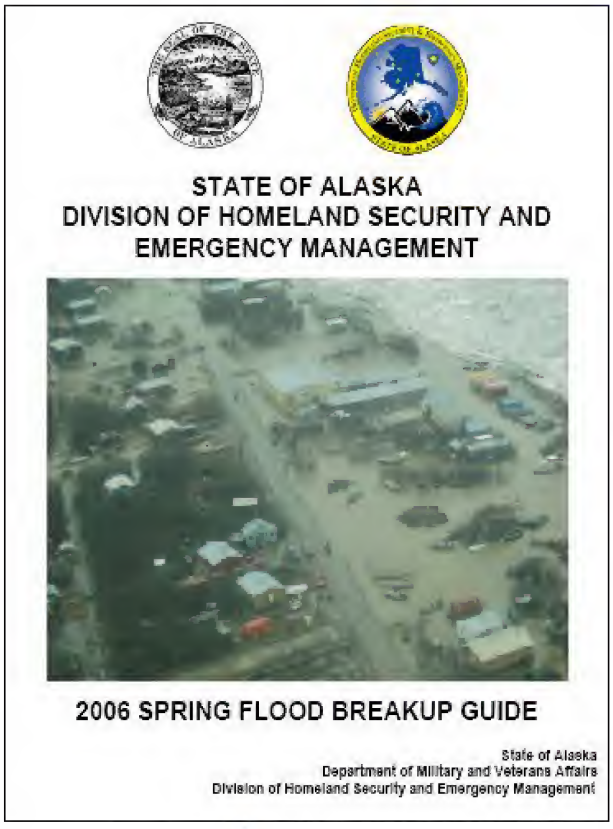


The NWS Alaska-Pacific River Forecast Center (APRFC) in Anchorage has teamed with the Alaskan Governor's Division of Homeland Security and Emergency Management (DHS&EM) on a program called "River Watch." The program's goal is to prepare Alaska's riverine communities for possible river flooding during the spring ice break-up season.

Each spring, for more than 20 years, the APRFC and DHS&EM have identified flooding dangers during breakup and provided warnings to potentially affected residents. Joint field teams from the two groups fly the major river ways to observe ice conditions and warn residents of potential ice jam flooding threats. The primary areas flown are along the Yukon River and the middle and lower Kuskokwim River, two areas with the greatest likelihood for ice jam flooding. To supplement the reconnaissance team reports, general aviation pilots report ice conditions as well. The APRFC analyzes the collected information and issues flood warnings and watches to affected communities. During flood events, the DHS& EM provides immediate on-site emergency coordination.

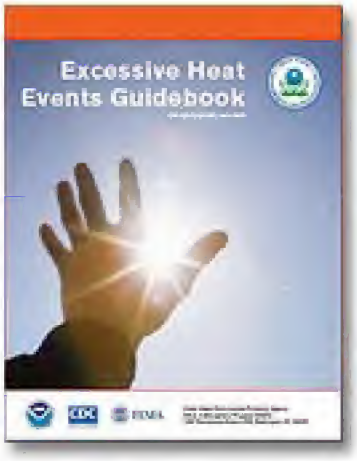
In addition to operating the River Watch Program, the APRFC and DHS&EM provide handouts on flooding safety. In early April, the DHS&EM mailed The 2006 Spring Flood Breakup Guide to 76 communities, tribal councils and boroughs that are prone to flooding. The Spring Breakup Guide outlines procedures communities can take to prepare for possible ice jam flooding. Some of the information contained in the guide includes how to put together a community flood plan, emergency contact lists, and information on what to do if flooding occurs.

For a copy of the 2006 Spring Flood Breakup Guide, log onto the DHS&EM website: www.ak-prepared.com. Click on "More News" at the bottom of the page, then "2006 Spring Breakup/Flood SOP Available" or call the Public Information Office at 907-428-7052.

Additionally, information on how to file a pilot ice report is provided at: aprfc.arh.noaa.gov/resources/rivwatch/rwpindex.php ❄

Heat Safety

Government Coalition Releases Excessive Heat Event Guide



By Melody Magnus, Aware Editor
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The Environmental Protection Agency, working with NOAA, FEMA and the Centers for Disease Control, just released its Excessive Heat Events Guidebook and a 1-page flyer summarizing excessive heat "Do's and Don'ts."

The guide's two goals are first, to provide local health and public safety officials with information needed to develop excessive heat event criteria and evaluate potential health impacts and second, to offer a menu of notification and response actions local officials should consider.

You can download the free 52-page book online at www.epa.gov/heatisland/about/heatresponseprograms.html. You order a free printed copy by calling the National Service Center for Environmental Publications at 1-800-490-9198. ❄

Hurricanes/Tropical Storms

NWS Makes Changes to Tropical Cyclone Products for 2006

By Tim Schott, NWS Marine and Tropical Storms Branch
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A number of Public Notices were disseminated earlier this year for changes to tropical cyclone products for the 2006 hurricane season: www.nws.noaa.gov/om/notif.htm. The NWS is requesting feedback until November 15 for three experimental products.

The first notice refers to the experimental Probabilistic Storm Surge Products associated with hurricanes. The products will be provided when the official National Hurricane Center forecast calls for a hurricane landfall within 24 hours along the Atlantic or Gulf coasts of the continental United States. Static examples, detailed descriptions and instructions for providing comments are posted online at www.weather.gov/mdl/psurge.

NWS is also seeking comments on an Experimental Tropical Cyclone Watch/Warning Text product. This product will be disseminated when routine and special Tropical Cyclone Advisories are issued or cancelled for the Atlantic and Gulf coasts of the continental United States, Puerto Rico and the U.S. Virgin Islands. Static examples, detailed descriptions and instructions for providing comments are posted online at www.nhc.noaa.gov/feedback-tcv.shtml.

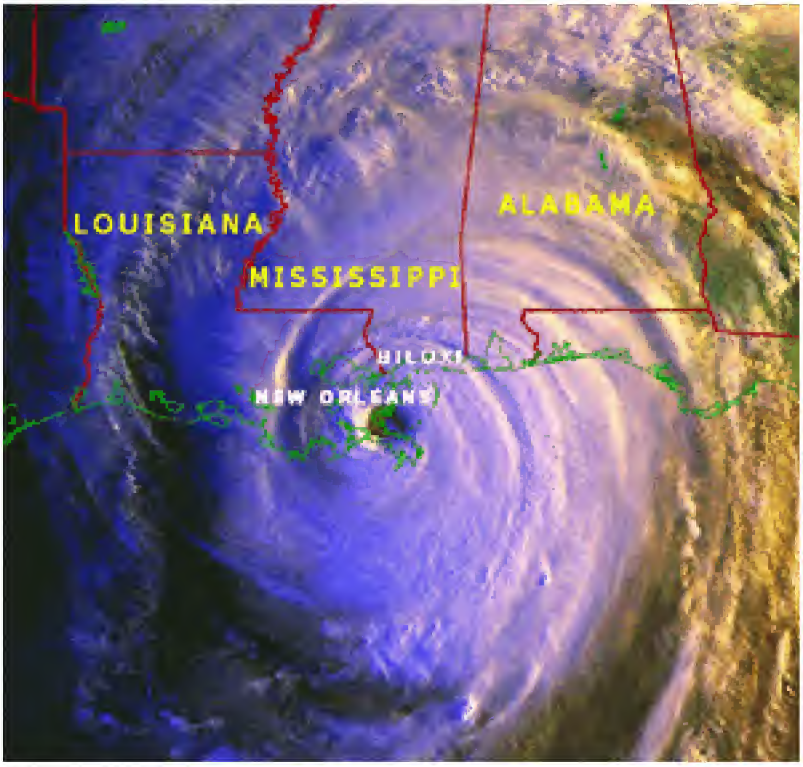
Finally, a number of Atlantic and Gulf coast Forecast Offices will be providing Tropical Cyclone Hazards Graphics when their forecast area of responsibility is under a tropical cyclone watch or warning. The hazards graphics will summarize the impacts from wind, tornadoes, coastal and inland flooding. Static examples, detailed descriptions and instructions for providing comments are online at www.weather.gov/os/tropical/hazards.htm. ❄

NWS Releases Service Assessment Report on Hurricane Katrina

By Wayne Presnell, Meteorologist, NWS Performance Branch
Wayne.Presnell@noaa.gov

At 6:10 a.m. Central Daylight Time on August 29, 2005, Hurricane Katrina made its impact on U.S. history when it struck southeast Louisiana. When it made landfall, Katrina was a large Category 3 hurricane with maximum sustained winds of 125 mph and a central pressure of 920 millibars. The day before, it had been a Category 5 hurricane with maximum sustained winds of 175 mph. Based on central pressure, Katrina is the third most intense U.S. land-falling hurricane on record.

Katrina's wind and storm surge devastated southeast Louisiana and coastal Mississippi. About 80 percent of New Orleans was covered with floodwater when levees were breached and storm surge flooded over them. The catastrophic damage and loss of life inflicted by this hurricane is staggering, with an estimated 1,353 direct fatalities (as of May 15, 2006) and 275,000 homes damaged or destroyed. According to the American Insurance Services Group, Katrina has generated an estimated $40.6 billion in insured losses as of June 2006. Total economic losses could be greater than $100 billion. These impacts make Katrina the costliest hurricane in U.S. history and one of the five deadliest hurricanes to strike the nation.



NOAA-15 satellite image of Hurricane Katrina at 7:47 a.m., Central Daylight Time, August 29, 2005, just east of New Orleans, LA.

The storm created extremely challenging working conditions for NWS employees. NWS offices in Louisiana and Mississippi lost communications, affecting their ability to monitor weather conditions and get out forecasts, warnings and information.

Using all available communication outlets, the NWS Weather Forecast Office (WFO) in New Orleans and the Southern Region Regional Operations Center used High Frequency amateur radio equipment to communicate with emergency management agencies and other NWS offices after commercial power was lost. NWS implemented continuity of operations plans for the impacted NWS offices in Louisiana and Mississippi.

Under these plans, NWS offices from Texas to Florida provided needed back-up services for up to 22 days. The length and breadth of the back-up services during Katrina was unprecedented. NWS staff used ingenuity, dedication and shear willpower to seamlessly provide products and services despite the failure of infrastructure and back-up systems.

When the storm was over, NWS assembled a Service Assessment Team (SAT) to review the performance of its offices. NWS routinely conducts service assessments to identify and share best-case operations, procedures and practices and address service deficiencies. The Katrina assessment paid particular attention to continuity of operations procedures/plans, coordination and collaboration with emergency managers and other decision makers and forecast and warning accuracy. The assessment found NWS performance was excellent before, during and after Katrina.

In preparation for each hurricane season, the National Hurricane Center (NHC) and FEMA organize the "Introduction to Hurricane Preparedness" course for emergency managers. Many

emergency managers in the New Orleans area found this course essential for effectively using NWS tropical cyclone products and services during Katrina.

The timeliness and accuracy of the forecast products and warnings issued by the NHC rated well above average. The hurricane forecast track error was considerably better than average through the 5-day forecast period. Lead times on hurricane watches and warnings for Louisiana, Mississippi, Alabama and the Florida panhandle were 8 hours above average. The intensity forecasts within 48 to 72 hours of landfall in southeast Louisiana correctly projected Katrina as a major hurricane (Category 3 or higher).

A noteworthy moment for the NWS came when WFO New Orleans issued a statement 1 day before Katrina's landfall stressing the likely intense impacts of the hurricane on southeast Louisiana and coastal Mississippi. The unprecedented language used to detail the catastrophic nature of the approaching hurricane reinforced the actions of emergency management officials as they coordinated one of the largest evacuations in U.S. history.

During the event, NWS Incident Meteorologists (IMET) served a critical role in the aftermath of Katrina by supporting the Louisiana EOC, the NOAA HAZMAT Team and WFO New Orleans. IMETs filled gaps in the weather observation network by installing observation equipment and setting up a portable data reception/transmission system for use by WFO New Orleans and local officials.

After the event, NWS provided users with follow-up information, despite the complicated back-up services and difficult working and living conditions. This service contributed significantly to critical customer decision making. NWS employed other innovative actions before, during and after Katrina including:

- Direct telephone calls from the NHC to the Governors of Louisiana and Mississippi
- Internet briefing tools such as video Hurricane Local Statements
- Products and interviews in Spanish
- Instant Messaging for communication

Flooding in New Orleans on Canal Street on the morning of August 31, 2005. Photo courtesy of the New Orleans Times Picayune.

In addition to traditional products, during Hurricane Katrina NWS issued a new product, the Extreme Tropical Cyclone Destructive Wind Warning. This product highlights the area of strongest winds near a hurricane's eye when it moves onshore and inland. Feedback on this product was mixed. Some thought it provided accurate detailed information on the strongest winds. Others users stated it was confusing when tornado warnings were also in effect because it uses the tornado warning product identifier. One call to action statement in the product asked people to go to the lowest floor of a building; however, some of these warnings were in effect for areas that had the potential for significant flooding. This conflict created a confusing and potentially dangerous situation. NWS is correcting the problems with the Extreme Tropical Cyclone Destructive Wind Warnings.

Hurricane Katrina was one of the most significant natural disasters in U.S. history. The impacts of the storm created challenging working conditions for NWS staff, but they performed exceptionally well. Forecasts were accurate and provided ample lead time. The language used in some of the products emphasized the catastrophic nature of the situation and created a sense of urgency in preparations. The NWS used many innovative ideas to provide high quality products and services. Even during the period of extended and complex back-up services, there was no degradation of services.

The report notes some opportunities for improvement, mainly regarding communication outages and back-up procedures. The report provides 16 recommendations for improvement and highlights 13 best practices to be applied to NWS operations in future hazardous events. The report was released on June 29, 2006, and can be viewed at: www.weather.gov/os/assessments/pdfs/Katrina.pdf.❄

Hurricane Survival Guide Created for Mid Texas Coast Residents

By Scott Cordero, MIC, NWS Corpus Christi, TX
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To enhance hurricane preparedness, WFO Corpus Christi formed a public-private partnership to get the word out. The group included the American Red Cross, Circle K fuel and convenience stores, KIII TV 3, Citgo Refinery, State Farm Insurance and Lyondell, a leading global chemical company. The team enabled NWS to prepare and distribute more than 85,000 hurricane awareness guides throughout the Coastal Bend area of Texas. The Official Coastal Bend Hurricane Survival Guide, 24 full-color pages, includes preparedness tips, evacuation routes, insurance tips from State Farm Insurance and other tools to help individuals, families and businesses prepare for a major storm. This guide is online at: www.srh.noaa.gov/crp/tropics/2006Guide/guide.php.

The mid-Texas coast has not experienced a direct assault from a major hurricane in 36 years, when Hurricane Celia crossed the coastline in 1970. Some consider the area overdue for a major storm. NWS wanted to provide its citizens with simple cost-effective measures they can take to mitigate their losses from hurricanes. The media has been invaluable in helping NWS to get word out for this years hurricane season.

This Hurricane Guide serves as a robust road map for action before, during and after a hurricane season. It's fantastic to fill up at a Circle K station and see citizens grab the guides off the shelves. More and more folks along the South Texas coast now know it only takes one! ❄

New Hurricane Flyer Now Available Online

By Melody Magnus, Editor
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NWS has developed a new trifold brochure detailing steps to take when a tropical storm or hurricane is on the way. This tri-fold color brochure explains:

- What to do before, during and after a hurricane
- What to bring to a shelter if you need to evacuate
- Differences between a Hurricane Watch and Warning

Some new information in the flyer includes revised policies on pets. Owners were previously told to leave pets home. After the enormous loss of life in Hurricane Katrina, many hurricane shelters are now taking pets. Owners are asked NOT to leave them home to fend for themselves. Numerous other updates were made from older publications such as referring to cell phones and other newer technologies.

The brochure also is available in a flyer format that does not require folding. The content is identical. Printed copies of the trifold should be available at local NWS offices before the peak hurricane season begins in mid-August. The flyer, which can be printed in color or in black and white, is available online now at: www.weather.gov/os/brochures/hurricane_safety.pdf ❄

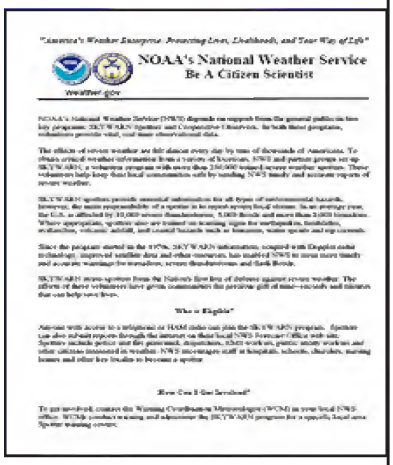
Update On Revision of Hurricane Booklet

By John Simensky, NWS Outreach Team
John.Simensky@noaa.gov

As announced in the spring edition of *Aware*, the popular publication, "Hurricanes...Unleashing Nature's Fury" is being given an overhaul. The revision will include updated information and illustrations from the active 2004 season and the record breaking 2005 season. A PDF file will be available on the NWS publications web page later this summer. Printed copies will be available from local NWS offices this fall. To check the status, go to www.weather.gov/os/brochures/. ❄

Outreach and Education

NWS Releases Cooperative Observer and Storm Spotter Flyer


NOAA's National Weather Service
Be A Citizen Scientist

By Melody Magnus, Aware Editor
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The NWS Outreach team has just released a new 1-page flyer describing the NWS Cooperative Observer and Storm Spotter programs. The flyer, entitled Citizen Scientist, offers details on what these volunteer jobs entail, how to sign up for training and where to get more information.

These programs are a great way to make local residents more aware of weather hazards and how they can be part of the solution. Citizen Scientists are an essential part of the NWS weather and climate program. The black and white flyer is online at www.weather.gov/os/brochures/Citizen_Scientist.pdf ❄

Conference Call Weather Briefings Prepare Customers for High River Flows and Significant Weather Events

By Peter Felsch, WCM, and Ray Nickless, Service Hydrologist, NWS Missoula, MT
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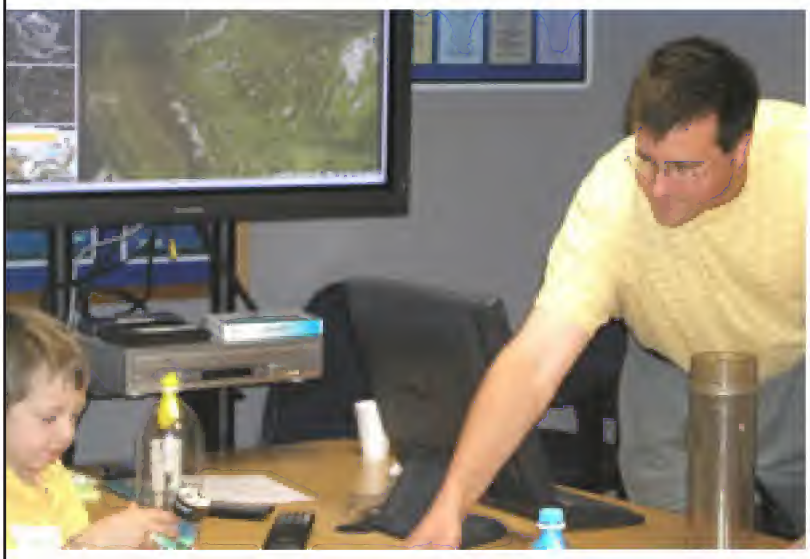
From April through mid-June, as staff at WFO Missoula, MT, Ray and I offered weekly web-based briefings for customers during significant weather events and high river flows in Montana and Idaho. Due to above normal winter snow pack in the Northern Rockies and projected river flows in the spring, Ray and I decided to conduct detailed weather briefings for customers, keeping them abreast of changing weather patterns and potential high runoff in the local rivers. These weather briefings improved coordination with media and law enforcement as well as disaster and emergency coordination personnel. They also gave these customers an opportunity to share feedback and valuable information regarding local rivers, streams and weather conditions as well as potential hazards in their specific areas of concern.

Conference call participants said the briefings were useful in preparing for potential flooding and high river flows. During the month of May, all rivers in north central Idaho and western Montana reached bank full levels, with the Bitterroot River in Montana maintaining flood stage for 1 week. As the rivers began to recede during early June, the focus of these briefings quickly shifted to small stream flooding and severe weather events.

WFO Missoula has developed a specific web briefing page in the outreach section of its website. The page features satellite and radar imagery, current and forecasted weather and snow pack tables. River graphs and charts are online to view during the conference calls. The "Weather Self Brief" is on the Internet at www.wrh.noaa.gov/mso/briefing.php. ❄

Weather Camp Offers Kids Severe Weather Safety Tips



Young weather enthusiasts get a half-day introduction to weather and NWS's own "camp."

By Jeff Savadel, WCM, WFO Elko, NV
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NWS Elko, NV, is partnering with the Elko City Parks & Recreation Department to host a half-day weather camp for local children. The camp was advertised through the city's Summer Activities program. The first camp was held on June 21; a second camp is scheduled for August 2.

Seven young weather enthusiasts, ranging in age from 6-12 years old, attended the first session. The kids were given a tour of the office, took weather observations, performed hands-on experiments and saw how forecasts and warnings are generated. Weather safety was discussed, including lightning and severe storm safety tips.

Each of the children received a certificate of accomplishment at the end of the day along with various handouts. ❄

NWS Partners Meeting Airs Concerns, Finds Common Ground

By Ron Gird, National Outreach Program Manager
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NWS hosted about three dozen constituents for the NWS Partners Meeting on June 6 in Silver Spring, MD. Attendees included TV weathercasters, emergency managers and representatives from academia, private sector companies and government agencies.

General D.L. Johnson, NWS Director, kicked off the meeting. Throughout the half-day session, he challenged NWS staff and the constituents attending to work toward common goals. Candid comments about the public/private partnership were shared by several speakers during the Directors Listening Session, which kicked off the meeting. Following the Listening Session, technical and service presenters took questions and comments from attendees. Topics of discussion included the Public/Private Sector Policy, the NWS aviation initiative, NWS/Partner communications and new tropical cyclone products.

The half day forum ended with an NWS Family of Services (FOS) session, reviewing data communication line services for derived weather information. The next meeting will be held at the annual AMS Conference in San Antonio, January 18, 2007. Partners attending the AMS conference are urged to also join the NWS Partners meeting. ❄

SPC Introduces New Severe Weather Products

By Dan McCarthy, WCM, NCEP
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The NWS Storm Prediction Center (SPC) is displaying three new experimental products on its web page.

- Day 4-8 Convective Outlook
- Enhanced Thunderstorm Outlook
- Day 3-8 Fire Weather Outlook.

These products should allow users to better plan and prepare for severe weather, thunderstorms and fire weather conditions. Users will be able to monitor future outlooks as possible events unfold and become near term.

These new products are available online at: www.spc.noaa.gov/products/exper.

Comments on these products are welcome at: www.spc.noaa.gov/misc/feedback.

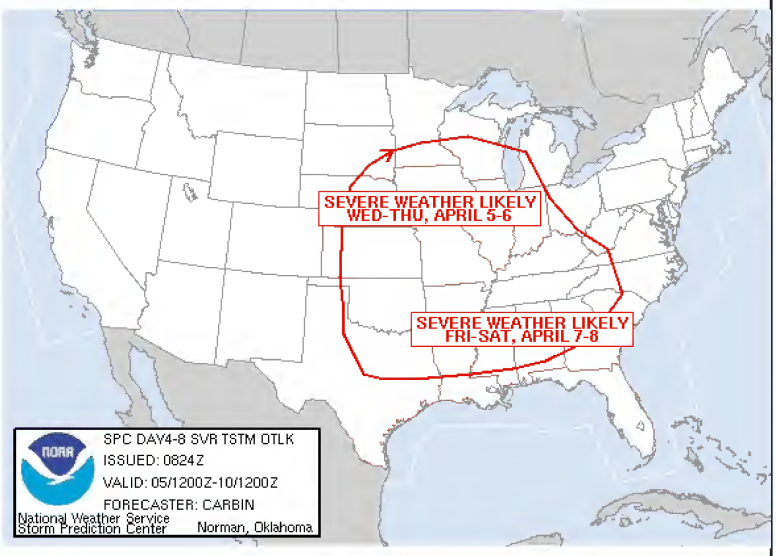

Figure 1: Day 4-8 Convective Outlook

Forecasters prepare the Day 4-8 Convective Outlook by using the latest ensemble and extended model forecasts to identify patterns that may lead to severe weather. This product enables users to get a head start on preparations such as staffing and notification. By using this tool and monitoring Day 2 and Day 3 Convective Outlooks, situation awareness is heightened before the day(s) of severe weather. **Figure 1** is an example of the product issued 7 days before the April 7, 2006, tornado outbreak in Tennessee.

SPC uses the General Thunderstorm line in the Convective Outlooks when it forecasts a 10 percent or greater probability for thunderstorms.

Advances in model data and techniques enables SPC forecasters to use the data to create the Enhanced Thunderstorm Outlook product.

This product shows areas where there is a 10 percent, 40 percent and 70 percent probability for thunderstorms. The time periods for these products are split between 1200 UTC (7 AM CDT) to 0300 UTC the next day (9 PM CDT that evening) in one panel, and between 0300

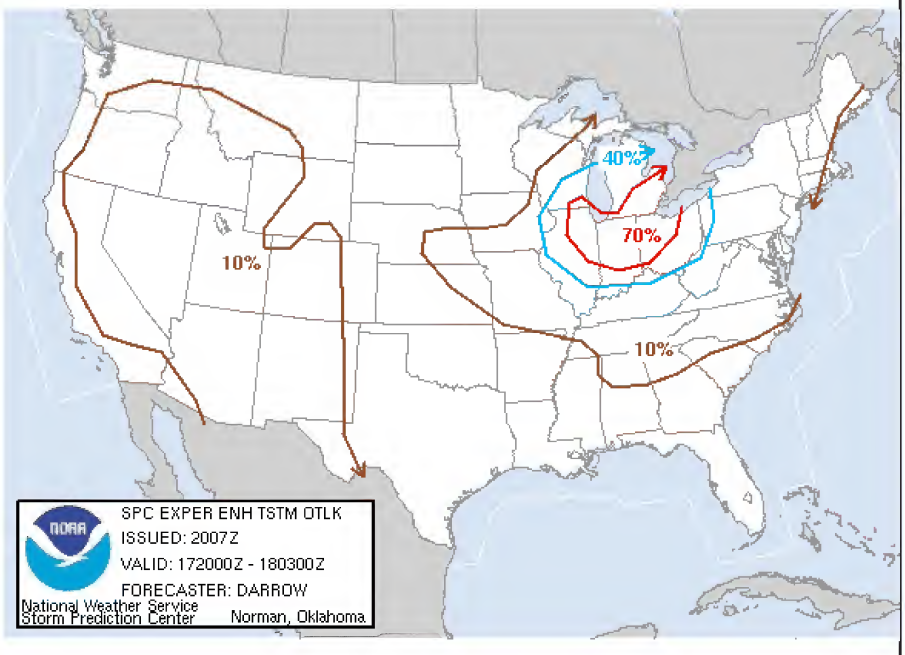

Figure 2: Enhanced Thunderstorm Outlook

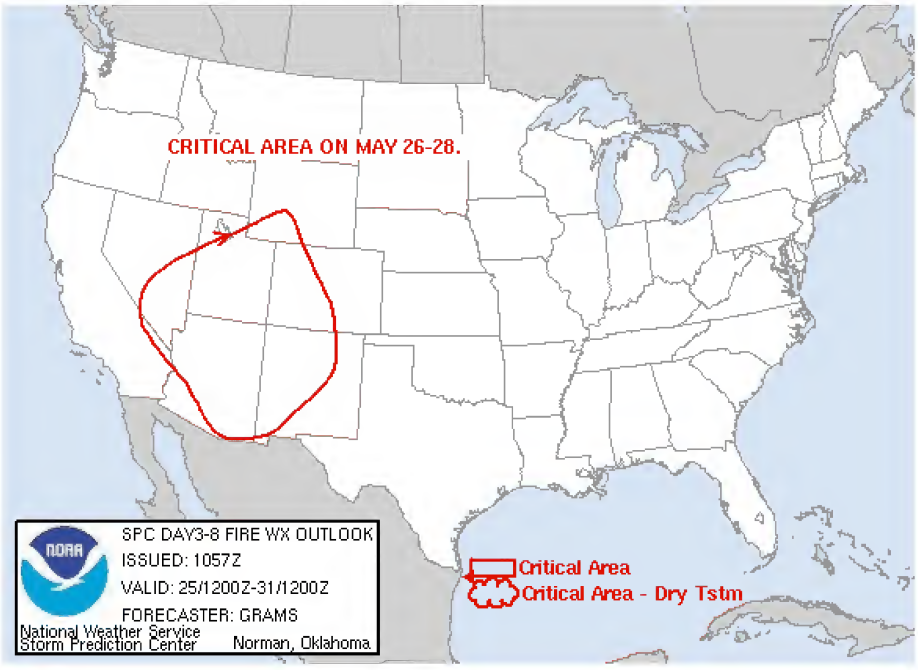

Figure 3: Day 3-8 Fire Weather Outlook WWUS40 KWNS 112221 WWP3

UTC (9 PM CDT) until 1200 UTC (7 AM CDT the next morning).

This split was made to depict the difference between thunderstorms occurring during the peak heating of the day and those that may develop overnight. This product can be useful in areas with an increased need for aviation and lightning safety (**Figure 2**).

Finally, drought and dry thunderstorm activity have increased the fire danger over many areas west of the Rocky Mountains. In response, SPC introduced the Day 3-8 Fire Weather Outlook for advanced identification of areas where conditions may become critical (**Figure 3**).

This spring, SPC also introduced the Convective Watch Hazard Probabilities, which adds probabilities for the specific type of severe weather. NWS issues this product as part of Severe Thunderstorm and Tornado Watches. The product offers more information on expected severity of storms by including probability for:

- Tornadoes
- Tornadoes that may produce F2 damage or worse
- Hail
- Hail 2 inches in diameter or larger
- Damaging winds
- Damaging winds greater than 65 kt (73 mph)
- Combined severe hail and wind.

The product identifier is under the WMO header: WWVS40 KWNS 112221 WWP3
The product is also available at www.spc.noaa.gov/products/watch. ❄

When Thunder Roars Go Indoors! Are Cell Phones Lightning Magnets?

By Melody Magnus, Aware Editor
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This year, the NWS National Lightning Safety campaign is trying to hammer home the warning that NO place is safe outside. In past years, the Lightning Safety Team, comprised of government, non-profit and commercial entities, stressed the need to get indoors but also offered outdoor "safety" tips.

In reality, there is no such thing as outdoor safety in a thunderstorm. Many people enjoy outdoor sports such as hiking, camping and fishing, which may make it impossible to promptly get to a safe location. The Lightning Safety Team recognizes the popularity of these activities,

but these lightning experts want outdoor enthusiasts to be aware of the risks they are taking.

Measures such as crouching, staying away from tall objects and out of the water may slightly reduce an individual's risk of being struck, but the only truly safe action is to get to a large, fully enclosed building (not a picnic shelter or beach bathroom) or to an enclosed vehicle (not a motorcycle or convertible).

The team's new slogan, When Thunder Roars Go Indoors, features Leon the Lion as its mascot. The campaign is aimed at children, who are often the most effective group at spreading safety messages to friends, family and recreational groups, such as sports teams.

While the number of people killed by lightning has been dropping, due in part to increased and continued education, many people are still injured by lightning and suffer lifelong disabilities that are hard to diagnose and treat.

Cell Phone Safety?

This year the team is also targeting the myth that cell phones are a hazard during lightning storms. The team considers cell phones safe to use during a storm, as long as you are in a substantial building or an enclosed vehicle. Regular phones, computers and other appliances that are directly connected to electrical lines should NOT be used during a thunderstorm. They pose a substantial hazard to the individual, and the device itself may be destroyed.

For more information on lightning safety, go to www.lightningsafety.noaa.gov/index.htm, ❄

Lightning at night. Photo taken near Socorro, NM. Photo courtesy of Harald Edens.

StormReady/TsunamiReady

Florida Makes StormReady® History, Disney Signs Up

By Melody Magnus, Editor
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In June, Lafayette County was recognized as the 67th StormReady® county in Florida, marking the state the third with all counties recognized by this NWS program. Hawaii and Delaware also have that honor. All counties in Hawaii are both TsunamiReady and StormReady.

Florida has some of the most severe weather in the country, with hurricanes, extremely heavy lightning strikes, tornadoes, floods, droughts, excessive heat and high winds. This state's achievement was enormous. The effort took years of efforts on the part of all seven NWS Weather Forecast Offices.

Florida not only numbers 67 StormReady counties, it also includes four StormReady® communities: Orlando, Oldsmar, Treasure Island and Indian Harbour Beach. Indian Harbour Beach has the distinction of being the first TsunamiReady community on the U.S. East Coast. Walt Disney World Resort in Orlando also joined the StormReady program in June as a new commercial site. Disneyland in California followed suit a few weeks later.

The Shoshone-Paiute Tribes of the Duck Valley Reservation in Northern Nevada and Southern Idaho became StormReady in July: Pictured from left are Kyle Prior, Tribal Council Member; Brent Hunter, Fire Management Officer; Terry Gibson, Tribal Chairman; Kevin Baker, NWS MIC; Lloyd Hanks, Steve Pursley, Tribal Council Members; Jeff Savadel, NWS WCM; Marvin Cota,Brian Thomas, Tribal Council Members.

NWS Southern Region Director Bill Proenza formally recognized the state as StormReady during a special briefing for Florida Governor Jeb Bush and state agency leaders. The recognition was part of a hurricane season briefing by Florida's Emergency Response Team.

"StormReady encourages communities to take a proactive approach to improving local hazardous weather operations and public awareness in partnership with their local National Weather Service office," said Proenza. "StormReady helps communities improve communication and safety skills needed to save lives - before, during and after the event."

Other major program achievements in the last few months include recognizing the Duck Valley Indian Reservation in Nevada; Mayaguez, the first site in Puerto Rico; the first Nuclear plant, San Onofre, CA; Vanderbilt University in Tennessee as well as many other new communities and counties across the country.

To find out more about the StormReady program, go to www.stormready.noaa.gov ❄

Online Summer Awareness Resources

By Melody Magnus, Aware Editor
Melody.Magnus@noaa.gov

For information on hurricane brochures and state awareness event links, go to www.weather.gov/om/hurricane/index.shtml

For heat information, go to: www.weather.gov/os/heat/index.shtml ❄

Climate, Water and Weather Links

Aviation Weather:	**aviationweather.noaa.gov/**
Education/Outreach:	**weather.gov/os/edures.htm**
Flooding/Water:	**www.floodsafety.noaa.gov/**
Hurricane Awareness	**www.weather.gov/om/hurricane/index.shtml**
Lightning Safety:	**lightningsafety.noaa.gov/**
Marine Weather:	**weather.gov/os/marine/home.htm**
MIC/WCM/SOO/DOH List:	**weather.gov/os/wcm-soo.pdf**
Natural Hazards Statistics:	**weather.gov/os/hazstats.shtml**
National Digital Forecast Database	**weather.gov/ndfd/**
NOAA Weather Radio Information:	**weather.gov/nwr/**
Past Weather/Climate:	**lwf.ncdc.noaa.gov/oa/ncdc.html**
Publications List:	**weather.gov/os/pubslist.htm**
Rip Current Awareness	**www.ripcurrents.noaa.gov/**
StormReady Home Page:	**stormready.noaa.gov/**
Severe Weather Safety:	**weather.gov/os/severeweather/index.shtml**